

IN THE CLAIMS.

1. (Currently Amended) An apparatus for processing a food product foodstuff comprising:

a transport having an entry and an exit different from said entry, wherein a food product enters said transport via said entry and moves to said exit;

wherein the transport includes an interior that rotatably contacts the food product between the entry and the exit;

one or more germicidal emitters for emitting a germicidal so that said germicidal inactivates one or more micro-organisms on surfaces of the food product in said interior transport, wherein said germicidal emitters are capable of withstanding a plurality of water sprays having pressures of up to 1,400 psig, and at temperatures up to 210 degrees Fahrenheit without said emitters failing due to one or more of water or heat damage substantially resulting from said sprays;

an assembly for securing having at least some one of said germicidal emitters in a predetermined arrangement, wherein the assembly includes electrical components for activating the at least one emitter of the assembly;

a support for supporting the assembly, wherein said assembly with its secured emitters is moveable on the support between:

(a) a first position wherein said secured at least one emitter[[s are]] is operable for inactivating the one or more micro-organisms on surfaces of the food product in said transport interior, and wherein the assembly is supported on the support so that a portion of the at least one germicidal emitter of the assembly is within the interior while the interior rotates; and

(b) a second position wherein said secured at least one emitter[[s are]] is substantially inoperable ineffective for inactivating, to a predetermined inactive level, the one or more micro-organisms on surfaces of the food product in said transport, and wherein the portion of the at least one emitter is supported on the support outside of the interior;

wherein in said second position is a preferred assembly position for one or more of: cleaning said assembly, cleaning said secured at least

one emitter[[s]], detaching [[an]] the at least one emitter from said assembly, securing another emitter to said assembly is performed; and one or more moveable tumblers for contacting the food product in said transport interior, wherein movement of when the interior rotates, said tumblers lift the food product in said transport interior so that the food product tumbles within said transport interior while the food product in said transport interior is exposed to said germicidal.

2. (Currently Amended) The apparatus of Claim 1, wherein germicidal emitters are capable of withstanding water sprays of at least 1,100 psig, and approximately no more than 1,350 psig without the emitters of the assembly failing due to one or more of water or heat damage substantially resulting from the water sprays.

3. (Currently Amended) The apparatus of Claim [[1]]2, wherein the water sprays are approximately 1,250 psig.

4. (Currently Amended) The apparatus of Claim 1, wherein germicidal emitters are capable of withstanding water sprays a temperature of at least 190 degrees Fahrenheit, and approximately no more than 200 degrees Fahrenheit without the emitters of the assembly failing due to one or more of water or heat damage substantially resulting from the water sprays.

5. (Currently Amended) The apparatus of Claim [[1]]4, wherein the water sprays are approximately 195 degrees Fahrenheit.

6. (Currently Amended) The apparatus of Claim 1 wherein the said transport includes a drum for rotating the food product, wherein said entry includes a first end of the drum and said exit includes a second end of the drum, and an interior surface of the drum includes at least a portion of the interior of the transport so that the interior surface of the drum rotates and contacts the food product therein.

7. (Currently Amended) The apparatus of Claim 6, wherein said drum includes at least one of said tumblers [[is]] attached to a surface of [[an]] the interior surface of said drum, said at least one tumbler is configured for assisting in moving the food product from the entry to the exit.

8. (Currently Amended) The apparatus of Claim 7, wherein said at least one tumbler includes a projection that extends from said drum interior surface toward an axis of drum rotation.

9. (Original) The apparatus of Claim 8, wherein said projection also extends from a first end substantially adjacent to said entry to a second end substantially adjacent to said exit.

10. (Original) The apparatus of Claim 8, wherein said projection has a spiral shape between said first and second ends.

11. (Currently Amended) The apparatus of Claim 9, wherein said drum has a downward inclination from said entry to said exit, the downward inclination being adjustable by an electronic controller while the drum is rotating.

12. (Currently Amended) The apparatus of Claim 6 wherein said tumblers rotate with a rotation of said drum, and said drum prevents transmission of the germicidal therethrough for at least most of the drum extent.

13. (Currently Amended) The apparatus of Claim 7 wherein said tumblers are attached to an interior circumference of said drum.

14. (Currently Amended) The apparatus of Claim 6, wherein at least one of said tumblers is detachable from ~~includes at least one recess on~~ [[an]] the interior surface of said drum, ~~wherein said recess extends away from an axis of drum rotation~~

15. (Currently Amended) The apparatus of Claim 14, wherein a cross section of said drum interior has a polygonal shape, the cross section being transverse to an axis of rotation of the drum ~~and said recess includes a vertex of the polygonal shape.~~

16. (Currently Amended) The apparatus of Claim 6 further comprises:

a drive mechanism for providing a rotational motion to said drum[[],]; and
a controller for sending a signal to change a rotational speed of the drum as a
result of the controller determining a reduced emission of the germicidal for inactivating
at least one of the micro-organisms wherein said drive mechanism includes one of an
electric, hydraulic, and pneumatic motor for operatively rotating an belt about an exterior
of said drum.

17. (Currently Amended) The apparatus of claim 1, wherein said germicidal includes one or more of radiation, light waves, sound waves, and ozone, and further including a controller for varying an amount of the germicidal emitted depending on an amount of the food product flowing through the interior of the transport.

18. (Currently Amended) The apparatus of claim 1, wherein said germicidal is ultraviolet light in the C wavelength band, and further including a controller for detecting whether a device for inhibiting the germicidal from escaping the interior is in a predetermined configuration for such inhibition.

19. (Currently Amended) The apparatus of claim 1, wherein said emitters emit ultraviolet radiation as the germicidal, and each of the emitters includes a glass container for emitting the germicidal, and the glass container is maintained in a shrink wrapped plastic coating fitting about the glass container during activation of the emitter are sleeved with a plastic for containment of glass in said emitters.

20. (Original) The apparatus of claim 1, wherein said emitters are capable of food product surface sterilization at a temperature of -40 degrees Fahrenheit.

21. (Currently Amended) The apparatus of Claim 1 further including one or more germicidal attenuating baffles for effectively preventing said germicidal from exiting from a predetermined volume, wherein said baffles are sufficiently close to said transport so that personnel adjacent to said transport but outside said predetermined volume are not exposed to an unsafe amount of said germicidal, and including a controller for receiving input from baffle sensors, wherein when the input is indicative of one of the baffles being in an undesirable configuration for operation of the food processing apparatus, the controller configures the food processing apparatus to be inoperable.

22. (Original) The apparatus of Claim 1, wherein an exposure of said germicidal to said food product surfaces does not substantially increase the temperature of said food product when said germicidal inactivates one or more micro-organisms on surfaces of the food product in said transport.

23. (Original) The apparatus of Claim 1, wherein an application of said germicidal to said food product surfaces does not substantially alter a flavor, texture, color, or other eating characteristics of said food product.

24. (Currently Amended) The apparatus of Claim 1, wherein said food product includes raw potatoes for thereby reducing [[at]] a potato spoilage.

25. (Original) The apparatus of Claim 1, wherein said food product includes one of: a spice, an herb, grains, nuts, rice, a cereal, crackers, a dehydrated food product, potato chips, corn chips, pork rinds, beef jerky, and a quick frozen food product.

26. (Original) The apparatus of Claim 24, wherein said quick frozen food product includes one of: corn, peas, carrots, whole potatoes, dehydrated potatoes, figs, peppers, French-fried potatoes, beef crumbles, beef trimmings, fajita meats, and shrimp.

27. (Original) The apparatus of Claim 1, wherein said food product includes a fresh food product.

28. (Original) The apparatus of Claim 27, wherein said fresh food product includes one of: potato dices and shreds, carrots, asparagus, broccoli, cauliflower, onions, brussels sprouts corn, peas, cucumbers, lettuce, beans, grains, beef, chicken, fish, shrimp, herbs, fruits, blueberries, cranberries, peeled and unpeeled tomatoes.

29. (Original) The apparatus of Claim 1, wherein said germicidal does not include a sterilizing chemical.

30. (Currently Amended) The apparatus of Claim 1, further including a controller for varying a rate of rotation of the interior thereby varying a tumbling the food product therein wherein the tumbling of the food product does not cause substantial breakage of the food product.

31. (Currently Amended) The apparatus of Claim 1, wherein at least one of said tumblers is detachable from the interior, and replaceable by a tumbler having a different shape or size.

32. (Original) The apparatus of Claim 1, wherein said germicidal reduces at least one of mold, fungi, bacteria, yeast, and the egg and/or larva of insects.

33. (Withdrawn) The apparatus of Claim 1, wherein the said transport includes a screw conveyor including an auger assembly for conveying the food product from said entry to said exit.

34. (Withdrawn) The apparatus of Claim 33 wherein said screw conveyor includes at least one of said tumblers between flights of the auger.

35. (Withdrawn) The apparatus of Claim 34 wherein the said at least one tumbler includes a projection that is attached to and extends from one of said flights towards an axis of rotation for said auger assembly.

36. (Withdrawn) The apparatus of Claim 34 wherein said at least one tumbler rotates with a rotation of said auger assembly.

37. (Withdrawn) The apparatus of Claim 33 wherein said screw conveyor has a downward, level, or upward inclination from said entry to said exit.

38. (Withdrawn) The apparatus of Claim 33 further comprises a drive mechanism for providing a rotational motion to said auger assembly, wherein said drive mechanism includes one of an electric, hydraulic, and pneumatic motor for operatively rotating said auger assembly.

39. (Withdrawn) The apparatus of claim 33, wherein said at least one tumbler is fastened between said flights.

40. (Withdrawn) The apparatus of claim 33, wherein said germicidal includes ultraviolet light in the C wavelength band.

41. (Withdrawn) The apparatus of claim 33, wherein said assembly for securing at least some of said emitters exposes the food product to said germicidal within the

transport for thereby reducing at least one of mold, fungi, bacteria, yeast, and the egg and/or larva of insects.

42. (Original) The apparatus of Claim 1 further including a controller for performing one or more of the following actions:

- (a) regulating an amount of the food product entering the transport, wherein said controller uses data indicative of an amount of food product in said transport, said data dependent upon sensor information related to an amount of food product in the transport;
- (b) obtaining germicidal information indicative of an amount of said germicidal required from said germicidal emitter for inactivating a predetermined amount of the micro-organisms, whereby said controller determines information for identifying an amount of the germicidal for emission by said germicidal emitter;
- (c) outputting one or more signals for changing a rate of movement of said tumblers for maintaining a predetermined degree inactivation of the micro-organisms;
- (d) outputting one or more signals for changing an inclination of said transport for maintaining a predetermined degree inactivation of the micro-organisms;
- (e) predicting an amount of the food product which will be in the transport at a future time, wherein said controller uses sensor data indicative of an amount of food product being moved to said entry;
- (f) preferring a first germicidal emission rate to a second germicidal emission rate, wherein said first germicidal emission rate is obtained in response to a user input for setting a germicidal emission rate for the germicidal emitters, and said second germicidal emission rate is not obtained in response to input from the user for setting a germicidal emission rate for the germicidal emitters, and wherein said second germicidal emission rate is used when said user input is not provided.

43. (Currently Amended) The apparatus of Claim 42, wherein said controller performs more than a majority ~~at least most~~ of the actions (a) through (f).

44. (Withdrawn) An apparatus for processing foodstuff comprising:

a transport having an entry and an exit different from said entry, wherein a food product enters said transport via said entry and moves to said exit;

one or more germicidal emitters for emitting a germicidal so that said germicidal inactivates one or more micro-organisms on surfaces of the food product in said transport;

one or more moveable tumblers for contacting the food product in said transport, wherein movement of said tumblers lift the food product in said transport so that the food product tumbles within said transport while the food product in said transport is exposed to said germicidal; and

a controller for performing one or more of the following actions:

- (a) regulating an amount of the food product entering the transport, wherein said controller uses data indicative of an amount of food product in said transport, said data dependent upon sensor information related to an amount of food product in the transport;
- (b) obtaining germicidal information indicative of an amount of said germicidal required from said germicidal emitter for inactivating a predetermined amount of the micro-organisms, whereby said controller determines information for identifying an amount of the germicidal for emission by said germicidal emitter;
- (c) outputting one or more signals for changing a rate of movement of said tumblers for maintaining a predetermined degree of inactivation of the micro-organisms;
- (d) outputting one or more signals for changing an inclination of said transport for maintaining a predetermined degree of inactivation of the micro-organisms;
- (e) predicting an amount of the food product which will be in the transport at a future time, wherein said controller uses sensor data indicative of an amount of food product being moved to said entry;

(f) preferring a first germicidal emission rate to a second germicidal emission rate, wherein said first germicidal emission rate is obtained in response to a user input for setting a germicidal emission rate for the germicidal emitters, and said second germicidal emission rate is not obtained in response to input from the user for setting a germicidal emission rate for the germicidal emitters, and wherein said second germicidal emission rate is used when said user input is not provided.

45. (Withdrawn) The apparatus of Claim 44 further including a data storage that includes, for each of a plurality of different food products, an amount of the germicidal to be emitted by said emitters for inactivating a particular degree of one or more micro-organisms on the surface of the food product.

46. (Withdrawn) The apparatus of Claim 44, wherein said controller performs at least some of the actions (a) through (f).

47. (Withdrawn) The apparatus of Claim 44, wherein said controller performs at least most of the actions (a) through (f).

48. (Withdrawn) The apparatus of Claim 44, wherein said controller performs all of the actions (a) through (f).

49. (Withdrawn) The apparatus of Claim 44, wherein at least one of said tumblers is replaceable by a tumbler having a different shape or size.

50. (Withdrawn) The apparatus of Claim 44, wherein said transport includes a drum through which the food product passes, and said apparatus further includes a drive mechanism for rotating said drum with the food product therein.

51. (Withdrawn) The apparatus of Claim 44, wherein said controller determines whether a request for reconfiguring said apparatus is safe to both personnel within a proximity of the apparatus, and sterilizes the food product to a predetermined degree

52. (Withdrawn) A method for surface sterilization of one or more food products, comprising:

first determining a size for a food product transport having an entry and an exit different from said entry, wherein a food product enters said transport via said entry and moves to said exit;

wherein said transport includes one or more tumblers for contacting the food product in said transport, wherein movement of said tumblers lift the food product in said transport so that the food product tumbles within said transport;

second determining at least one of a quantity and configuration of one or more emitters of a germicidal relative to the food product in said transport, wherein said germicidal inactivates one or more micro-organisms on a surface of the food product in said transport;

wherein said first and second determining steps are dependent upon at least some of (a) through (f) following:

- (a) a rate at which a food product is provided for surface sterilization;
- (b) an amount of the germicidal to be emitted by said emitters for inactivating a particular quantity of one or more micro-organisms on the surface of the food product;
- (c) an amount of the germicidal to which the food product is expected to be exposed in said transport;
- (d) an elapsed time that an individual item of the food product is expected to be in said transport;
- (e) a shape and a density of the food product;
- (f) a temperature of the food product.

53. (New) The apparatus of Claim 7, wherein the drum includes a polished surface for reflecting the germicidal.

54. (New) The apparatus of Claim 1, wherein the assembly is adjustable so that a distance from the at least one emitter to the food product in the interior is adjustable.

55. (New) The apparatus of Claim 1, wherein the assembly is adjustable for changing an orientation of the assembly relative to an axis of rotation of the transport interior.

56. (New) The apparatus of Claim 1, further including a sensor for determining a weight of the food product in the transport interior.

57. (New) The apparatus of Claim 1, further including a sensor for detecting a depth of the food product rotating in the transport interior.

58. (New) The apparatus of Claim 1, further including at least two sensors for detecting a quantity of the food product at different positions in the interior between the transport entry and exit, wherein a difference in the quantity detected is indicative of a food product blockage in the transport interior.

59. (New) The apparatus of Claim 1, wherein the electrical components includes circuitry for varying a number of emitters that are activated.

60. (New) The apparatus of Claim 1, further including a controller for predicting a future amount of the food product in the interior of the transport.

61. (New) A method for processing a food product comprising:

providing a transport having an entry and an exit different from said entry, wherein a food product enters said transport via said entry and moves to said exit;

wherein the transport includes an interior that rotatably contacts the food product between the entry and the exit;

providing one or more germicidal emitters for emitting a germicidal so that said germicidal inactivates one or more micro-organisms on surfaces of the food product in said interior;

wherein an assembly includes at least one of said one or more germicidal emitters, wherein the assembly includes electrical components for activating the at least one emitter of the assembly;

providing a support for supporting the assembly in:

- (a) a first position wherein the at least one emitter of the assembly is operable for inactivating the one or more micro-organisms on surfaces of the food product in the interior, and wherein the assembly is supported on the support so that a portion of the at least one germicidal emitter is within the interior while the interior rotates; and
- (b) a second position wherein said the at least one emitter of the assembly is substantially ineffective for inactivating, to a predetermined inactive level, the one or more micro-organisms on surfaces of the food product in said interior, and wherein the portion of the at least one emitter is suspended on the support outside of the interior;

wherein in said second position one or more of: cleaning said assembly, cleaning said emitters of the assembly, detaching an emitter from said assembly, securing an emitter to said assembly is performed; and

wherein when the interior rotates and the assembly is in the first position, the food product tumbles within said interior and is exposed to said germicidal.

62. (New) The method of Claim 61, further including providing a controller for controlling one or more of:

- (a) changing a rotation rate of the interior, wherein a change in the rotation rate is dependent upon a sterilization rate of the one or more micro-organisms; and
- (b) changing an inclination of the interior between the entry and the exit, wherein a change in the inclination is dependent upon a sterilization rate of the one or more micro-organisms.

63. (New) The method of Claim 62, wherein the controller controls both the changing of the rotation rate, and the changing of the inclination.

64. (New) The method of Claim 61, further including a step of receiving input from one or more sensors, wherein the input includes one of: a weight of the food product

being rotated in the interior, a depth of the food product being rotated in the interior, an angle of inclination of the interior, and a rate of rotation of the interior of the transport.

65, (New) The method of Claim 61, wherein the assembly slides on the support between the first position and the second position.

66. (New) The method of Claim 61, further including a step of predicting amount of the food product that will be in the interior at a future time using sensor data indicative of an amount of the food product being moved to the entry.

67. (New) An apparatus for processing a food product comprising:
an interior means for rotatably contacting the food product when transporting a food product therethrough;

one or more germicidal emitters for emitting a germicidal so that the germicidal inactivates one or more micro-organisms on surfaces of the food product in the interior means;

an assembly having at least one of the germicidal emitters, wherein the assembly includes electrical components for activating the emitters of the assembly;

a support for supporting the assembly, wherein the assembly is moveable via the support between:

- (a) a first position wherein the at least one emitter of the assembly is operable for inactivating the one or more micro-organisms on surfaces of the food product in the interior means, and wherein the assembly is supported on the support so that a portion of at least one of the germicidal emitters of the assembly is within the interior means while the interior means rotates; and
- (b) a second position wherein said the at least one emitter of the assembly is substantially ineffective for inactivating, to a predetermined inactive level, the one or more micro-organisms on surfaces of the food product, and wherein the portion of the at least one emitter is supported on the support outside of the interior means;

wherein in said second position one or more of: cleaning said assembly, cleaning said at least one emitter of the assembly, detaching

the at least one emitter from said assembly, securing a different emitter to said assembly is performed; and

wherein when the interior means rotates and the assembly is in the first position, the food product tumbles within said interior means and is exposed to said germicidal.